

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 18

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JAY D. KEASLING,
DOUGLAS G. BOLESCH and
THOMAS A. DELFINO

Appeal No. 1997-2755
Application 08/311,426

ON BRIEF

Before WINTERS, WILLIAM F. SMITH, and LORIN Administrative Patent Judges.
WILLIAM F. SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the final rejection of claims 1, 3 and 5 through 9, all the claims remaining in the application.

Claims 1, 3, 8 and 9 are illustrative of the subject matter on appeal and read as follows:

1. A method of bioremediation of organic halide contaminated groundwater, said method comprising the steps of:

(a) adding, in situ to groundwater contaminated with an organic halide and comprising a microbial population capable of reductive dehalogenation of said organic halide, a carbohydrate in an amount sufficient to permit in situ microbial reductive dehalogenation of said organic halide, and thereafter

(b) incubating said groundwater in situ under substantially reducing conditions to completely reductively dehalogenate at least a portion of said organic halide, whereby the concentration of said organic halide in said groundwater is reduced, wherein said organic halide is a halogenated hydrocarbon

3. A method according to claim 1, wherein said organic halide is trichloroethene.

8. A method according to claim 1, wherein said carbohydrate is a monosaccharide or disaccharide.

9. A method according to claim 1, wherein said carbohydrate is glucose.

The reference relied upon by the examiner is:

Fathepure et al. (Fathepure), "Complete Degradation of Polychlorinated Hydrocarbons by a Two-Stage Biofilm Reactor," Applied and Environmental Microbiology, Vol. 57, No. 12, (December 1991), pp.3418-3422.

A further reference discussed by this merits panel is:

Dooley-Danna et al. (Dooley-Danna), "The Sequential Anaerobic/Aerobic Biodegradation of Chlorinated Ethenes in an Aquifer Simulator," Abstracts of the 89th Annual Meeting of the American Society for Microbiology, Abstract No. Q-32, (1989), p. 335.

Claims 1, 3 and 5 through 9 stand rejected under 35 U.S.C. §112, first paragraph (enablement). Claims 1, 3 and 5 through 9 stand rejected under 35 U.S.C. §103. As evidence of obviousness, the examiner relies upon Fathepure. We reverse.

DISCUSSION

1. CLAIM INTERPRETATION

Independent claim 1 recites a method of bioremediation of organic halide contaminated groundwater which comprises the steps of (a) adding in situ to groundwater contaminated with an organic halide and containing therein a microbial population capable of reductive dehalogenation of the organic halide, a carbohydrate, and thereafter (b) incubating the groundwater in situ under substantially reducing conditions to completely reductively dehalogenate at least a portion of the organic halide. The limitations recited in part (b) of claim 1 are defined on lines 32-33 of page 8 and lines 1-3 of page 9 in the specification as follows:

"....the organic halide is completely reductively dehalogenated meaning that all the halide groups of the organic halide are replaced with hydride groups.

In bulk, a detectable portion of the organic halide is converted to a completely reduced form, e.g. trichloroethene to ethene.”

From this definition given in the specification, the claims on appeal can be interpreted to mean that a portion of the organic halide in the groundwater (i.e. 25%, 50%, etc.) has all of its halide groups reductively replaced with hydride groups so that it is in a completely reduced form with no halide groups remaining. In addition, the dehalogenation of the organic halide occurs under reducing (anaerobic) conditions only.

2. ENABLEMENT REJECTION

The issue raised by the examiner under 35 U.S.C. §112, first paragraph, is whether the terms “carbohydrate” and “organic halide” are unduly broad and would require undue experimentation by one of ordinary skill in the art to determine which carbohydrates or halides are operative in the instant invention. The examiner is of the opinion that there is insufficient guidance or direction presented in the specification to direct one to determine which substances would work in the claimed method. The examiner feels that a large number of inoperative embodiments are encompassed by the claims on appeal.

We do not agree with the examiner’s position since the allegations made by the examiner are not supported by any factual evidence. Thus, the examiner has not established a prima facie case of non-enablement. The examiner has not explained why the guidance set forth in the specification for the selection of particular carbohydrates to use in the claimed method, as well as for the testing, of which organic halides become

dehalogenated as a result of performing the method is inadequate. Mere conclusions are unacceptable.

To the extent the examiner is concerned that the claims might [be] “inoperable embodiments,” we refer to Atlas Powder Co. v. E.I. Du Pont De Nemours & Co., 750 F.2d 1569, 1576-77, 224 USPQ 409 (Fed. Cir. 1984) when the “ Even if some of the claimed combinations were inoperative, the claims are not necessarily invalid. ‘It is not a function of the claims to specifically exclude possible inoperative substances.’” In re Dinh-Nguyen, 492 F.2d 856, 858-59, 181 USPQ 46, 48 (CCPA 1974).”

For the above reasons, we reverse the examiner’s rejection under 35 U.S.C. §112, first paragraph.

3. PRIOR ART REJECTION

The rejection of the claims under 35 U.S.C. §103 using the reference to Fathepure is premised upon the examiner’s belief that it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the method disclosed by Fathepure in situ since Fathepure suggests the feasibility of in situ degradation by the same method as recited in the claims on appeal.

When the claims on appeal are interpreted as set forth above in Section No. 1, the examiner’s rejection under 35 U.S.C. §103 falls apart since the claims clearly require the complete reductive dehalogenation of at least a portion of the organic halide in the

groundwater examined. The method taught by Fathepure involves the complete degradation of polychlorinated hydrocarbons by a two-stage biofilm reactor. In this reactor, organic halides such as hexachlorobenzene (HCB), tetrachloroethylene (PCE), and chloroform (CF) are first reductively dechlorinated in an anaerobic portion using a carbon source such as glucose. These organic halides, however, are only dechlorinated to the levels of tri- and dichlorinated products in the anaerobic portion of the reactor. See Table I on page 3420 of Fathepure. Complete dechlorination of these organic halides only occurs in the second aerobic stage of the reactor where an oxygen source is added. Therefore, Fathepure fails to teach of the complete reductive dehalogenation of the organic halides. Rather, the method of Fathepure requires a second, aerobic step to achieve complete dehalogenation.

Fathepure also fails to describe an in situ method of organic halide dehalogenation as part of that work. To supply this missing teaching, the examiner refers to a reference 7a (Dooley-Danna) disclosed on page 3422 of Fathepure. However, the examiner Dooley-Danna describe the sequential anaerobic/aerobic biodegradation of chlorinated ethenes in an aquifer simulator. In situ biodegradation of tetrachloroethylene (PCE) and trichloroethylene (TCE) is performed by adding nutrients to groundwater that stimulate the activity of naturally occurring bacteria. In the first anaerobic stage, PCE and TCE are degraded to dichloroethylene (DCE). Oxygen is then introduced in the aerobic stage to

initiate the oxidation and further dehalogenation of DCE by methanotrophic bacteria.

Therefore, Dooley-Danna also fails to describe teach the complete reductive dehalogenation of organic halides. Rather, this reference also requires a second aerobic step to bring about complete dehalogenation, similar to the method of Fathepure.

In the Examiner's Answer (Paper No. 14, April 15, 1996), the examiner argues that Fathepure teaches on page 3420, column 2, last paragraph bridging to page 3421, that trace amounts of dechlorinated products are formed in the anaerobic reactor which reads on the present claims. However, the reference to Fathepure does not "read on the present claims" since as mentioned above, the process disclosed by Fathepure is performed in a two-stage bioreactor, not in situ. In addition, the process taught by Fathepure fails to achieve complete reductive dehalogenation. The portion of the reference cited by the examiner in the Examiner's Answer states that PCE and CF are converted to dechlorinated products such as cis-1,2-dichloroethylene (cis-1,2-DCE) and methylene chloride in the anaerobic stage of the bioreactor. Therefore, these organic halides still contain the halide chlorine after the initial anaerobic stage. Complete reductive dehalogenation as required by the claims on appeal is not achieved in the anaerobic stage of by Fathepure.

For all of these reasons, we reverse the examiner's rejection of claims 1 and

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5 through 7 under 35 U.S.C. §103. Similarly, since claims 3, 8 and 9 all depend from independent claim 1, we reverse the examiner's rejection of claims 3, 8 and 9 under 35 U.S.C. §103.

REVERSED

Sherman D. Winters)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
William F. Smith)	
Administrative Patent Judge)	APPEALS AND
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